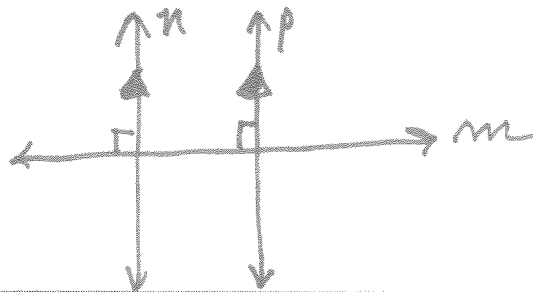


# 3-5 Study Guide and Intervention

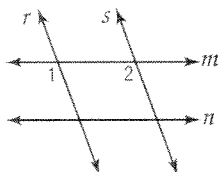
## Proving Lines Parallel

**Identify Parallel Lines** If two lines in a plane are cut by a transversal and certain conditions are met, then the lines must be parallel.

If	then
<ul style="list-style-type: none"> <li>corresponding angles are congruent,</li> <li>alternate exterior angles are congruent,</li> <li>consecutive interior angles are supplementary,</li> <li>alternate interior angles are congruent, or</li> <li>two lines are perpendicular to the same line,</li> </ul>	the lines are parallel.

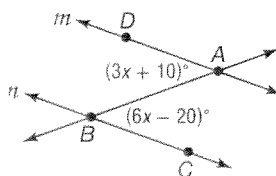


**Example 1** If  $m\angle 1 = m\angle 2$ , determine which lines, if any, are parallel. State the postulate or theorem that justifies your answer.



$\angle 1$  and  $\angle 2$  are corresponding angles of lines  $r$  and  $s$ . Since  $\angle 1 \cong \angle 2$ ,  $r \parallel s$  by the Converse of the Corresponding Angles Postulate.

**Example 2** Find  $m\angle ABC$  so that  $m \parallel n$ .

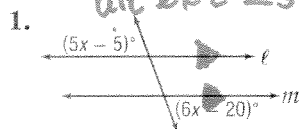


We can conclude that  $m \parallel n$  if alternate interior angles are congruent.

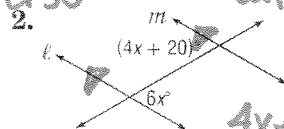
$$\begin{aligned}
 m\angle BAD &= m\angle ABC \\
 3x + 10 &= 6x - 20 \\
 10 &= 3x - 20 \\
 30 &= 3x \\
 10 &= x \\
 m\angle ABC &= 6x - 20 \\
 &= 6(10) - 20 \text{ or } 40
 \end{aligned}$$

## Exercises

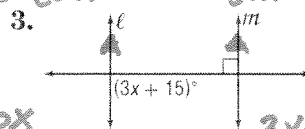
Find  $x$  so that  $l \parallel m$ . Identify the postulate or theorem you used.



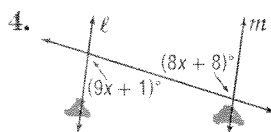
$$\begin{aligned}
 5x - 5 &= 6x - 20 \\
 15 &= x
 \end{aligned}$$



$$\begin{aligned}
 4x + 20 &= 6x \\
 10 &= x
 \end{aligned}$$



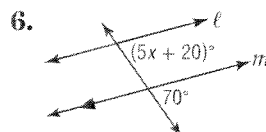
$$\begin{aligned}
 3x + 15 &= 90 \\
 x &= 25
 \end{aligned}$$



$$\begin{aligned}
 9x + 1 &= 8x + 8 \\
 x &= 7
 \end{aligned}$$



$$\begin{aligned}
 2x &= 3x - 20 \\
 x &= 20
 \end{aligned}$$



$$\begin{aligned}
 5x + 20 &= 70 \\
 x &= 10
 \end{aligned}$$